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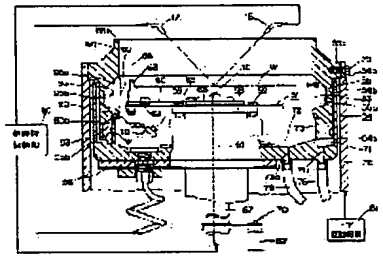
(54) SUBSTRATE TREATMENT APPARATUS

(57)Abstract:
PROBLEM TO BE SOLVED: To separate a treatment liquid excellently.
SOLUTION: A splash guard 55 movable upwards and downwards is arranged so as to surround a spin chuck 51 rotatable holding a wafer W. Below the splash guard 55, a treatment cup 54 having a first tank 71 for retrieving a chemical and a second tank 72 for the waste liquid of a treatment liquid is provided. On the internal wall surface of the splash guard 55, first and second guide areas 91 and 92 separated up and down by a transverse protrusion 90 projecting inside are provided. A treatment liquid scattering around from the wafer W hits the first or second guide area 91 or 92, and is received by the first or second tank 71 or 72 below it. By controlling the height of the splash guard 55, it is possible to make the treatment liquid hit the first or second guide area 91 or 92.



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21/027		21/30	５６９Ｃ

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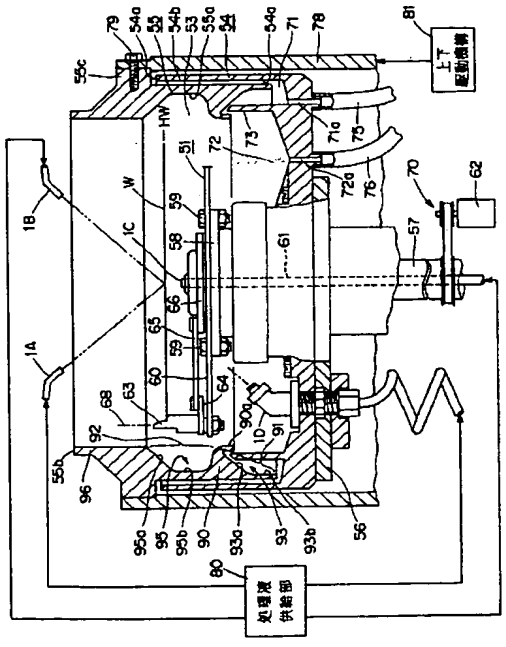
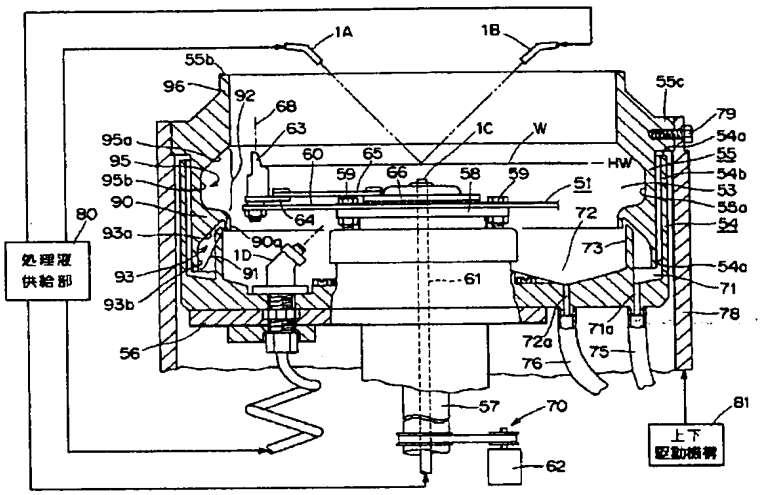
(54)【発明の名称】　基板処理装置

(57)【要約】
【課題】処理液の分離を良好に行う。
【解決手段】ウエハＷを保持した状態で回転することができるスピンチャック５１を取り囲むように、上下に変位可能なスプラッシュガード５５が配置されている。スプラッシュガード５５の下方には、薬液回収のための第１の槽７１と、処理液の廃液のための第２の槽７１とを有する処理カップ５４が設けられている。スプラッシュガード５５の内壁面には、内方に突出した横向き凸部９０によって上下に分離された第１誘導エリア９１と第２誘導エリア９２とが設けられている。ウエハＷから周囲に飛散する処理液は、第１誘導エリア９１または第２誘導エリア９２に当たり、それらの下方の第１の槽７１または第２の槽７２に受け入れられる。スプラッシュガード５５の高さを制御することによって、処理液を第１誘導エリア９１または第２誘導エリア９２に当てることができる。



105，106　ボールブッシュ
125　上側可動プレート
132，133，158，159　圧縮コイルばね
140　モータ
151，152，153，155，156　フォトマイクロセンサ
161，162　蛇腹
163，164　ボールブッシュ
165，166　処理カップシャフト
167　下側可動プレート
168，169　当接ピン
190　空気流通路
191　連通路
192　連通路
200　制御部

【図1】



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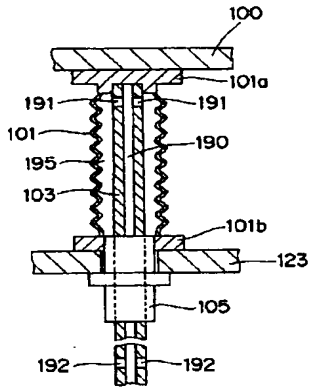

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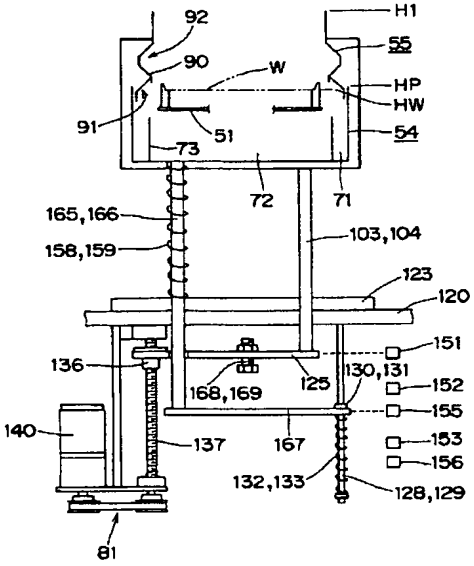

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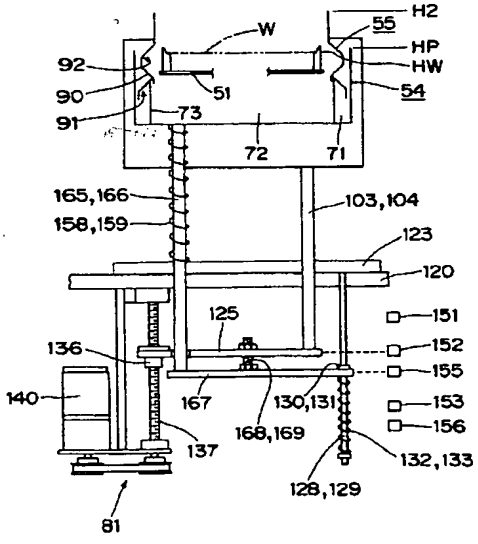

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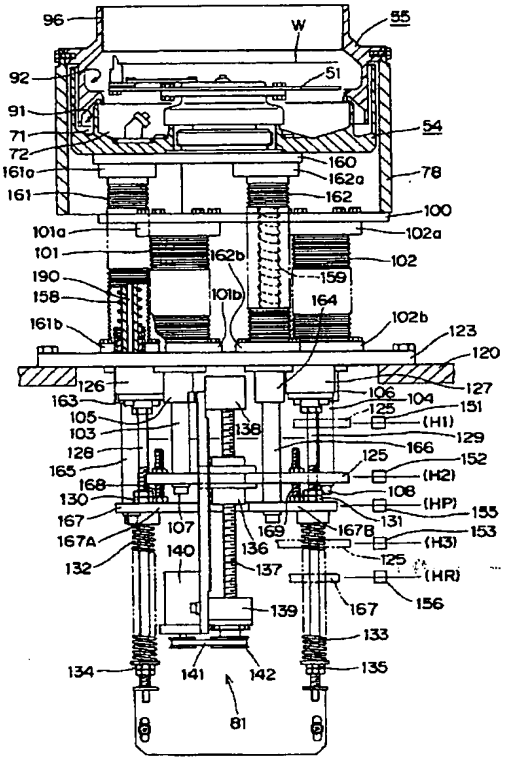
96
W
55
92
51
91
71
72
54
160
161a
162a
78
161
162
100
101a
102a
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102
159
190
158
101b
164
161b
102b
123
120
126
127
163
106
104
151
105
125
(H1)
103
138
129
128
166
125
152
165
(H2)
168
108
130
(HP)
131
155
167
107
169
167a
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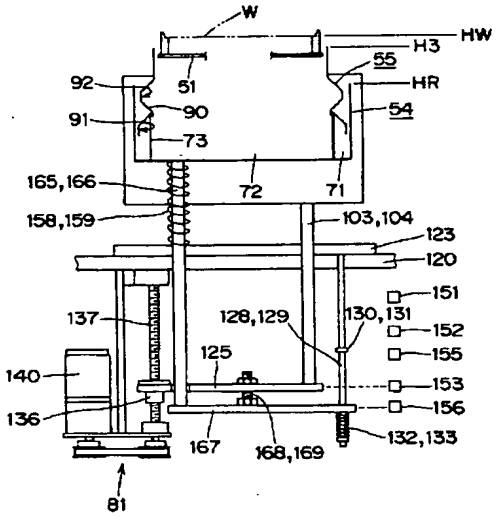
137
125
(HR)
156
139
167
133
134
141
142
135
81

【図6】


W
HW
H3
55
92
51
HR
91
90
54
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165,166
72
71
158,159
103,104
123
120
151
137
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130,131
152
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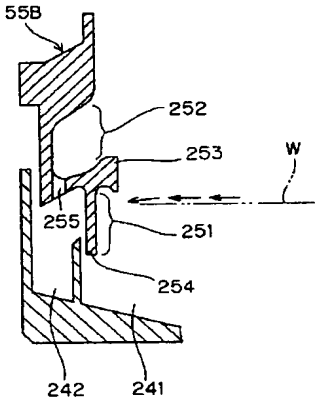
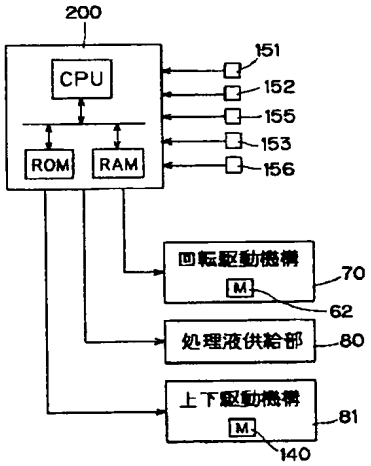
140
153
156
136
167
168,169
132,133
81

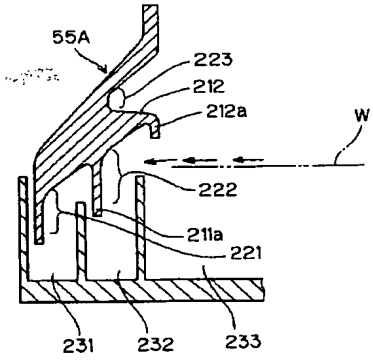
【図9】


55B
252
253
W
255
251
254
242
241

【図7】


200
CPU
151
152
155
153
156
ROM
RAM
回転駆動機構
M
70
62
処理液供給部
80
上下駆動機構
M
81
140

【図8】


55A
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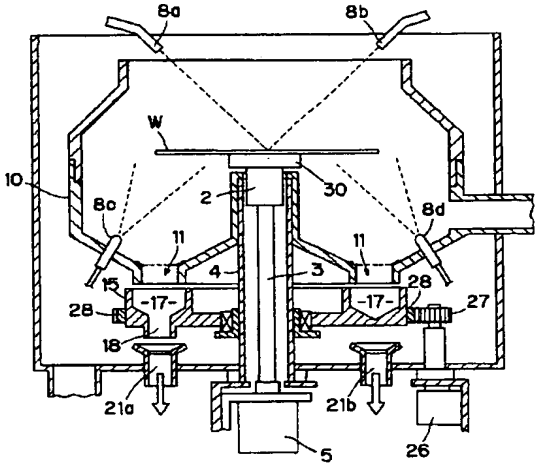
212a
W
222
211a
221
231
232
233

【図１０】



CLAIMS

[Claim(s)]
[Claim 1] The substrate hold base which rotates where a substrate is held, and the processing liquid supply means for supplying alternatively the 1st processing liquid and the 2nd processing liquid to the front face of the substrate held on this substrate hold base, Are prepared so that the above-mentioned substrate may be surrounded, and it has the internal surface mostly formed in the symmetry of revolution to the rotation axis of the above-mentioned substrate hold base. The lead member for guiding the processing liquid of the above 1st and the 2nd processing liquid which disperse from the substrate rotated with the above-mentioned substrate hold base, The 1st lead area where the processing liquid of the above 1st which disperses from the substrate which is formed in the internal surface of the above-mentioned lead member, and is in the rotation status with the above-mentioned substrate hold base should hit, The 2nd lead area where the processing liquid of the above 2nd which disperses from the substrate which is formed up and is in the rotation status with the above-mentioned substrate hold base rather than the above-mentioned 1st lead area in the internal surface of the above-mentioned lead member should hit, The sideways heights which it is formed in the boundary section of the above-mentioned 1st lead area and the above-mentioned 2nd lead area, and was projected to the inner direction toward the above-mentioned substrate hold base, The vertical drive means for moving the above-mentioned lead member up and down relatively to the above-mentioned substrate hold base, While the processing liquid of the above 1st which was arranged caudad and guided by the above-mentioned 1st lead area of the above-mentioned lead member rather than the above-mentioned substrate hold base is received While the processing liquid of the 1st tub which has an exhaust port for discharging this 1st accepted processing liquid, and the above 2nd which was arranged caudad and guided by the above-mentioned 2nd lead area of the above-mentioned lead member rather than the above-mentioned substrate hold base is received In case the 2nd tub which has an exhaust port for discharging this 2nd accepted processing liquid, and the substrate by which the processing liquid of the above 1st was held on the above-mentioned substrate hold base are supplied So that the above-mentioned vertical drive means may be controlled and the 1st processing liquid which disperses from the concerned substrate may hit the above-mentioned 1st lead area In case a 1st control means to control the relative height to the above-mentioned substrate hold base of the above-mentioned lead member, and the processing liquid of the above 2nd are supplied to the substrate held on the above-mentioned substrate hold base The substrate processor characterized by including a 2nd control means to control the relative height to the above-mentioned substrate hold base of the above-mentioned lead member so that the above-mentioned vertical drive means may be controlled and the 2nd processing liquid which disperses from the concerned substrate may hit the above-mentioned 2nd lead area.
[Claim 2] The substrate processor according to claim 1 characterized by including further a 3rd control means to control the relative height to the above-mentioned substrate hold base of the above-mentioned lead member so that the above-mentioned vertical drive means may be controlled and it may be caudad located rather than the substrate by which the processing liquid attachment site of the above-mentioned lead member was held on the above-mentioned substrate hold base.
[Claim 3] The substrate processor according to claim 1 or 2 characterized by the thing which was prepared in the site near the above-mentioned sideways heights of the above-mentioned 1st lead area, became depressed up, and opened wide caudad, and for which it declines and has the concavity further.
[Claim 4] The substrate processor according to claim 1 to 3 characterized by having further the sideways concavity which was prepared in the above-mentioned 2nd lead area, became depressed toward the orientation which deserts the above-mentioned substrate hold base, and was wide opened in the orientation of the above-mentioned substrate hold base.
[Claim 5] The substrate processor according to claim 4 characterized by having further the upward heights formed by being prolonged up in the upper part of the above-mentioned sideways concavity.
[Claim 6] The tub which the tub which the 1st above-mentioned tub and the 2nd tub are arranged so that one side may enclose another side from the method of outside, and has been arranged inside is a waste cistern for carrying out the waste fluid of the received processing liquid, and has been arranged at the method of outside is a substrate processor according to claim 1 to 5 characterized by being a recovery tub for collecting the received processing liquid for reuse.
[Claim 7] While a penetrant remover is made to supply from the penetrant-remover supply means for supplying a penetrant remover towards the dummy substrate held on the above-mentioned substrate hold base or the above-mentioned substrate hold base, and the above-mentioned penetrant-remover supply means The substrate processor according to claim 1 to 6 characterized by having further the washing control means for washing this lead member by the penetrant remover which is made to rotate the above-mentioned substrate hold base, disperses from the above-mentioned substrate hold base or a dummy substrate by this, and is equivalent to the above-mentioned lead member.
[Claim 8] The substrate processor according to claim 1 to 7 characterized by having further the guide shaft arranged along the perpendicular orientation in order to guide vertical movement of the above-mentioned lead member, and the bellow cross parallel which it is arranged so that this guide shaft may be surrounded, and are expanded and contracted in connection with a vertical move of the above-mentioned lead member.
[Claim 9] The above-mentioned guide shaft is a substrate processor according to claim 8 which carries out the characteristic feature of the free passage path for making the internal space of the above-mentioned bellow cross parallel and the outer space of the above-mentioned bellow cross parallel open for free passage being formed in the interior.

[Claim 10] An energization means to turn the 1st above-mentioned tub and the 2nd above-mentioned tub up, and to energize them, It has the lead member side contact section prepared fixed to the above-mentioned lead member, and the tub side contact section prepared fixed to the 1st above-mentioned tub and the 2nd above-mentioned tub. the above-mentioned vertical drive means It is what moves the above-mentioned lead member up and down. the above-mentioned lead member side contact section and the above-mentioned tub side contact section Both the contact section contacts in the process in which the above-mentioned lead member is dropped to a predetermined position. after that The substrate processor according to claim 1 to 9 characterized by being arranged so that the above 1st and the 2nd tub may also resist and down to the energization force of the above-mentioned energization means in connection with a down of the above-mentioned lead member.
[Claim 11] The internal surface of the above-mentioned lead member is a substrate processor according to claim 1 to 10 characterized by consisting of the smooth surface without a discontinuous point.
[Claim 12] The above-mentioned processing liquid supply means is a substrate processor according to claim 1 to 11 characterized by being what supplies processing liquid towards the center-of-rotation position of the inferior surface of tongue of the substrate held on the above-mentioned substrate hold base.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] this invention relates to the substrate processor for processing to processed substrates, such as a semiconductor wafer and a glass substrate for LCDs.
[0002]
[Description of the Prior Art] The process which performs processing to the thin film formed in the front face and its front face of a processed substrate is included in the manufacturing process of a semiconductor device or a LCD by supplying processing liquid to a processed substrate like a semiconductor wafer or the glass substrate for liquid-crystal-display panels. The equipment for carrying out such a process is indicated by JP,5-20231,U, and the configuration is shown in the drawing 10 of this application.
[0003] This equipment is equipped with the spin chuck 30 which can rotate where substrate W is held, the motor 5 for carrying out high-speed rotation of the spin chuck 30 through **** 3, the container 10 which surrounds substrate W processed and forms a processing room, and the processing liquid nozzles 8a, 8b, 8c, and 8d for supplying processing liquid from the slanting upper part or a slanting lower part to substrate W. The exhaust port 11 for discharging processing liquid after using it for processing of substrate W is formed in the pars basilaris ossis occipitalis of a container 10.
[0004] It is attached in the protection [which has the gutter 17 of the shape of a ring which counters an exhaust port 11 underneath the container 10] cylinder 4 whose disk-like gutter material 15 surrounds **** 3 mostly free [rotation]. The effluent flowing-down opening 18 is formed in one predetermined place of the pars basilaris ossis occipitalis of a gutter 17. Moreover, the ring gear 28 is being fixed to the periphery of the gutter material 15, and the drive gear 27 attached in the driving shaft of a motor 26 has geared to this ring gear 28.
[0005] Below, abandonment drain opening 21a for [of the gutter material 15] discarding processing liquid and recovery drain opening 21b for collecting processing liquid are prepared further. By such configuration, the effluent flowing-down opening 18 of the gutter material 15 can be alternatively located in the upper part of either abandonment drain opening 21a or recovery drain opening 21b by driving a motor 26. In case this supplies a medical fluid like an etching reagent or a developer to a substrate, the effluent flowing-down openings 18 can be collected because of reuse of a medical fluid by making it located in the upper part of recovery drain opening 21b. On the other hand, in order to, wash out the medical fluid attached to substrate W for example, when injecting a pure water to substrate W, water after using for washing processing can be discarded by locating the effluent flowing-down opening 18 in the upper part of abandonment drain opening 21a.
[0006]
[Problem(s) to be Solved by the Invention] However, the path from the container 10 to [an above-mentioned configuration] the flowing-down opening 18 of the disk-like gutter material 15 through the effluent opening 11 is common to the medical fluid for etching processing etc., and water after using it for washing processing. That is, the processing liquid for recovery and the processing liquid for abandonment pass along a common path. Therefore, mixture of these 2 liquid cannot be avoided but a separation becomes imperfect. Consequently, since it was discarded with the pure water after using the drop of the medical fluid adhering to the path common to the above for washing processing, the medical fluid became useless and there was a problem that there was much medical fluid consumption. Moreover, at the time of recovery of a medical fluid, since the waterdrop adhering to the path common to the above mixed, the concentration of a medical fluid became low and the problem fall gradually also had a substrate throughput by the medical fluid.
[0007] On the other hand, since it rotates with a gear drive and the separation with a medical fluid and a pure water was attained by rotation of this gutter material 15, the disk-like gutter material 15 had a possibility that the raising dust from the sliding section of a gear drive might affect substrate processing. Then, the purpose of this invention is being able to solve an above-mentioned technical technical probrem, being able to separate processing liquid good, and offering the substrate processor which can also reduce raising dust moreover.
[0008]
[The means and effect of the invention] for solving a technical probrem Invention according to claim 1 for attaining the above-mentioned purpose The substrate hold base which rotates where a substrate is held, and the processing liquid supply means for supplying alternatively the 1st processing liquid and the 2nd processing liquid to the front face of the substrate held on this substrate hold base, Are prepared so that the above-mentioned substrate may be surrounded, and it has the internal surface mostly formed in the symmetry of revolution to the rotation axis of the above-mentioned substrate hold base. The lead member for guiding the processing liquid of the above 1st and the 2nd processing liquid which disperse from the substrate rotated with the above-mentioned substrate hold base, The 1st lead area where the processing liquid of the above 1st which disperses from the substrate which is formed in the internal surface of the above-mentioned lead member, and is in the rotation status with the above-mentioned substrate hold base should hit, The 2nd lead area where the processing liquid of the above 2nd which disperses from the substrate which is formed up and is in the rotation status with the above-mentioned substrate hold base rather than the above-mentioned 1st lead area in the internal surface of the above-mentioned lead member should hit, The sideways heights which it is formed in the boundary section of the above-mentioned 1st lead area and the above-mentioned 2nd lead area, and was projected to the inner direction toward the above-mentioned substrate hold base, The vertical drive means for moving the above-mentioned lead member up and down relatively to the above-mentioned substrate hold base, While the processing liquid of the above 1st which was arranged caudad and guided by the above-mentioned 1st lead area of the above-mentioned

lead member rather than the above-mentioned substrate hold base is received While the processing liquid of the 1st tub which has an exhaust port for discharging this 1st accepted processing liquid, and the above 2nd which was arranged caudad and guided by the above-mentioned 2nd lead area of the above-mentioned lead member rather than the above-mentioned substrate hold base is received In case the 2nd tub which has an exhaust port for discharging this 2nd accepted processing liquid, and the substrate by which the processing liquid of the above 1st was held on the above-mentioned substrate hold base are supplied So that the above-mentioned vertical drive means may be controlled and the 1st processing liquid which disperses from the concerned substrate may hit the above-mentioned 1st lead area In case a 1st control means to control the relative height to the above-mentioned substrate hold base of the above-mentioned lead member, and the processing liquid of the above 2nd are supplied to the substrate held on the above-mentioned substrate hold base As the above-mentioned vertical drive means is controlled and the 2nd processing liquid which disperses from the concerned substrate hits the above-mentioned 2nd lead area, it is the substrate processor characterized by including a 2nd control means to control the relative height to the above-mentioned substrate hold base of the above-mentioned lead member.

[0009] According to this configuration, the 1st processing liquid which dispersed from the front face of a substrate is led to the 1st tub from the 1st lead area by the relative vertical movement to the substrate hold base of a lead member, and the 2nd processing liquid which dispersed from the front face of a substrate is led to the 2nd tub from the 2nd lead area. Thereby, a separation with the 1st processing liquid and the 2nd processing liquid is attained. Therefore, since the 1st processing liquid and the 2nd processing liquid do not pass along a common path, the 1st processing liquid and the 2nd processing liquid are separable good. And since the gear drive etc. is not used, there is little raising dust, therefore it can process a substrate good.

[0010] the [moreover,] -- the boundary section of 1 lead area and the 2nd lead area -- a substrate hold base -- going -- the inner direction -- vegetation -- since the sideways heights is formed the bottom, the separation of the processing liquid between the 1st lead area and the 2nd lead area is also good Invention according to claim 2 is a substrate processor according to claim 1 characterized by including further a 3rd control means to control the relative height to the above-mentioned substrate hold base of the above-mentioned lead member, as the above-mentioned vertical drive means is controlled and it is caudad located rather than the substrate by which the processing liquid attachment site of the above-mentioned lead member was held on the above-mentioned substrate hold base.

[0011] According to this configuration, the processing liquid attachment site (site to which processing liquid may have adhered) of a lead member can be caudad located rather than the substrate held on the substrate hold base. Therefore, in case a substrate is set to a substrate hold base or a substrate is taken out from a substrate hold base for example, it can prevent the processing liquid adhering to the lead member falling to a substrate.

[0012] Invention according to claim 3 is a substrate processor according to claim 1 or 2 characterized by the thing which was prepared in the site near the above-mentioned sideways heights of the above-mentioned 1st lead area, became depressed up, and opened wide caudad, and for which it declines and has the concavity further. With this configuration, the downward concavity prepared near the sideways heights prevents that the processing liquid which hit the 1st lead area enters the 2nd lead area. Moreover, the processing liquid which hit the 2nd lead area can also prevent entering the 1st lead area by work of this downward concavity. Thereby, a separation of processing liquid can much more be ensured.

[0013] Invention according to claim 4 is a substrate processor according to claim 1 to 3 characterized by having further the sideways concavity which was prepared in the above-mentioned 2nd lead area, became depressed toward the orientation which deserts the above-mentioned substrate hold base, and was wide opened in the orientation of the above-mentioned substrate hold base. With this configuration, it prevents that the processing liquid which hit the 2nd lead area jumps out of the sideways concavity prepared in the 2nd lead area up. Thereby, surrounding contamination can be prevented and processing liquid can be certainly led to the 2nd tub.

[0014] Invention according to claim 5 is a substrate processor according to claim 4 characterized by having further the upward heights formed by being prolonged up in the upper part of the above-mentioned sideways concavity. With this configuration, processing liquid can prevent dispersing around certainly by the upward heights prolonged in the upper part of the above-mentioned sideways concavity.

[0015] Invention according to claim 6 the 1st above-mentioned tub and the 2nd tub The tub which is arranged so that one side may enclose another side from the method of outside, and has been arranged inside It is a waste cistern for carrying out the waste fluid of the received processing liquid, and the tub arranged at the method of outside is a substrate processor according to claim 1 to 5 characterized by being a recovery tub for collecting the received processing liquid for reuse.

[0016] With this configuration, since a waste cistern is arranged inside and the recovery tub is arranged outside, even if the processing liquid which should be collected may enter into a waste cistern, the processing liquid which should be carried out waste fluid can prevent entering into a recovery tub certainly. The processing liquid which jumps out in the orientation which deserts a substrate hold base is because it is led to a waste cistern by the lead area corresponding to the waste cistern before reaching an outside recovery tub, if the waste fluid of it should be carried out.

[0017] While invention according to claim 7 makes a penetrant remover supply from the penetrant-remover supply means for supplying a penetrant remover towards the dummy substrate held on the above-mentioned substrate hold base or the above-mentioned substrate hold base, and the above-mentioned penetrant-remover supply means By the penetrant remover which is made to rotate the above-mentioned substrate hold base, disperses from the above-mentioned substrate hold base or a dummy substrate by this, and is equivalent to the above-mentioned lead member It is the substrate processor according to claim 1 to 6 characterized by having further the washing control means for washing this lead member.

[0018] By this configuration, a lead member can be washed automatically, without preparing the configuration for washing particularly. Thereby, processing liquid adheres to a lead member, and it crystallizes, and can prevent that this serves as a particle. Invention according to claim 8 is a substrate processor according to claim 1 to 7 characterized by having further the guide shaft arranged along the perpendicular orientation, and the bellow cross parallel which it is arranged so that this guide shaft may be surrounded, and are expanded and contracted in connection with a vertical move of the above-mentioned lead member, in order to guide vertical movement of the above-mentioned lead member.

[0019] The influence of substrate processing on raising dust of in the sliding section of a guide shaft by this configuration can be prevented with a bellow cross parallel. Thereby, since raising dust can be suppressed, good substrate processing is attained. Furthermore, since the processing liquid ambient atmosphere and a guide shaft are isolated with a bellow cross parallel, the cauterization of a guide shaft can be prevented. Invention according to claim 9 is a substrate processor according to claim 8 with which the free passage path for the above-mentioned guide shaft making the internal space of the above-mentioned bellow cross parallel and the outer

space of the above-mentioned bellow cross parallel open for free passage carries out the characteristic feature of being formed in the interior.
[0020] According to this configuration, since it is open for free passage with outer space, even if a bellow cross parallel expands and contracts, reduced pressure or compression of internal air do not produce the internal space of a bellow cross parallel. Therefore, since a bellow cross parallel can be made to expand and contract smoothly, a lead member can be moved up and down smoothly. An energization means for invention according to claim 10 to turn the 1st above-mentioned tub and the 2nd above-mentioned tub up, and to energize, It has the lead member side contact section prepared fixed to the above-mentioned lead member, and the tub side contact section prepared fixed to the 1st above-mentioned tub and the 2nd above-mentioned tub. the above-mentioned vertical drive means It is what moves the above-mentioned lead member up and down. the above-mentioned lead member side contact section and the above-mentioned tub side contact section Both the contact section contacts in the process in which the above-mentioned lead member is dropped to a predetermined position. after that It is the substrate processor according to claim 1 to 9 characterized by being arranged so that the above 1st and the 2nd tub may also resist and down to the energization force of the above-mentioned energization means in connection with a down of the above-mentioned lead member.
[0021] According to this configuration, if a lead member is dropped, the lead member side contact section will contact the tub side contact section, and the 1st and 2nd tubs will down with a lead member after that. Moreover, if a lead member is raised, the 1st and 2nd tubs will also go up simultaneously by work of an energization means. Thereby, the lead member, the 1st, and 2nd tubs can be made to fluctuate in a mode different, respectively with one vertical drive for moving a lead member up and down.
[0022] Moreover, since the spacing of a tub and a lead member can be shortened by having been made to make not only a lead member but the 1st and 2nd tubs fluctuate, the height of a tub becomes low and processing liquid can be certainly led to the 1st tub or the 2nd tub by the simple lead member of a configuration. Invention according to claim 11 is a substrate processor according to claim 1 to 10 characterized by the internal surface of the above-mentioned lead member consisting of the smooth surface without a discontinuous point.
[0023] According to this configuration, there is no possibility that the processing liquid which processing liquid did not pile up in the internal surface of a lead member, therefore piled up may disperse on a substrate front face. Thereby, substrate processing can be performed good. Invention according to claim 12 is a substrate processor according to claim 1 to 11 characterized by the above-mentioned processing liquid supply means being what supplies processing liquid towards the center-of-rotation position of the inferior surface of tongue of the substrate held on the above-mentioned substrate hold base.
[0024] since processing liquid can be turned and supplied to the center of rotation of the inferior surface of tongue of a substrate, without according to this configuration this supplied processing liquid is transmitted to the inferior surface of tongue of a substrate and it almost falls -- the [the 1st or] -- it is led to 2 lead area Therefore, recovery of processing liquid or the luminous efficacy of abandonment is good.
[0025]
[Embodiments of the Invention] Below, the gestalt of operation of this invention is explained in detail with reference to an accompanying drawying. Drawing 1 is a cross section showing the configuration of the substrate processor concerning the 1 operation gestalt of this invention. The spin chuck 51 which this substrate processor is for performing washing processing using the medical fluid or the pure water to wafer W which is the substrate of a processing object, and is a substrate hold base for holding wafer W and rotating, The nozzles 1A and 1B for carrying out the regurgitation of the processing liquid, such as medical fluids, such as fluoric acid, and a pure water, to the front face of wafer W held at the spin chuck 51, Medial-axis nozzle 1C for carrying out the regurgitation of the processing liquid towards the center of the inferior surface of tongue of wafer W of the status that it was held at the spin chuck 51 (inferior-surface-of-tongue nozzle), It has nozzle 1D for washing for mainly supplying a pure water from a slanting lower part towards a spin chuck 51 for washing of a spin chuck 51.
[0026] The spin chuck 51 is held in the processing room 53. The processing room 53 is formed of the processing cup 54 and the splash guard 55 as a lead member which moves up and down to this processing cup 54. The rotation axis 57 is arranged so that the center section of the base of the processing cup 54 may be inserted in, and the anchoring disk 60 is being fixed to the installation flange 58 prepared in the upper limit of this rotation axis 57 with the bolt 59.
[0027] Three chuck pins 63 for holding the pars marginalis of wafer W are set up at equal intervals along the periphery of the anchoring disk 60 by the top of the anchoring disk 60. However, in drawing 1 , in order to avoid that a drawing becomes complicated, only one chuck pin 63 is shown. The chuck pin 63 has the level wafer installation side for holding wafer W from down, and the standup side for wafer regulation for regulating the circumferential end face of wafer W. The swinging arm section 64 is formed in the base edge of the chuck pin 63. The nose of cam of this swinging arm section 64 is connected with the end of a link 65 free [rotation]. The other end of a link 65 is connected with the operation disk 66 prepared near the center of a spin chuck 51 free [rotation]. This operation disk 66 rotates only a predetermined angle domain to the circumference of a rotation axis 57 with the chuck drive outside drawing. If this operation disk 66 is rotated, the swinging arm section 64 can be made to rock through a link 65, and the chuck pin 63 will rotate to the circumference of a vertical axis as a result. Therefore, if constituted from the 2nd page which is in the position which estranged the standup side for wafer regulation of the chuck pin 63 from the rotation axis 68 rather than the 1st page close to the rotation axis 68 of the chuck pin 63, and this 1st page, and makes a predetermined angle to the 1st page, by rotation of the chuck pin 63, the chuck of the wafer W can be carried out, or it can be opened wide.
[0028] The processing liquid supply pipe 61 has inserted in the center of a rotation axis 57, and above-mentioned medial-axis nozzle 1C is prepared in the upper limit of this processing liquid supply pipe 61. The rotation drive 70 equipped with the motor 62 as a driving source etc. is combined near the soffit of a rotation axis 57. Where a spin chuck 51 is rotated with this rotation drive 70, by supplying a medical fluid and a pure water from nozzle 1A or 1D, processing to wafer W can be performed or a spin chuck 51 can be washed. A medical fluid and a pure water supply such nozzle 1A or 1D from the processing liquid feed zone 80. It has [pure water] two or more valves for supplying each nozzle alternatively in the pure water storage tank for storing the medical fluid tank for this processing liquid feed zone 80 storing the medical fluid, and the pure water, and the medical fluid. The processing liquid supply means and the penetrant-remover supply means are constituted by this processing liquid feed zone 80, and above-mentioned nozzle 1A or above-mentioned 1D.
[0029] The processing cup 54 is a closed-end cylindrical shape-like container mostly, and the cylinder-like dashboard section 73 projects it in a base towards the upper part, and it is formed in it. Thereby, between the dashboard section 73 and outer wall 54a of the processing

cup 54, the anchor-ring-like 1st tub 71 is formed in plane view, and the cylinder-like 2nd tub 72 is mostly formed inside the dashboard member 73. The 1st tub 71 is a recovery tub for collecting the medical fluids like an etching reagent, and effluent opening 71a for recovery combined with the recovery piping 75 is formed in the base. The recovery piping 75 is combined with the predetermined medical fluid tank with which the processing liquid feed zone 80 was equipped through the VCF (not shown) for purifying the collected medical fluid. Moreover, the 2nd tub 72 is a waste cistern for receiving the processing liquid which should be discarded like the pure water after washing processing of wafer W, and effluent opening 72a for waste fluid combined with the waste fluid piping 76 is formed in the base.

[0030] On the other hand, the splash guard 55 has the configuration almost symmetrical with rotation to the axis passing through the center of a rotation axis 57. And it is attached in the support member 78 of the shape of a cylinder which surrounds the processing cup 54. The vertical move of the support member 78 of the shape of this cylinder is carried out with the vertical drive 81 mentioned later, and, thereby, a splash guard 55 can move up and down now to a spin chuck 51.

[0031] The splash guard 55 has internal-surface 55a which has a configuration symmetrical with rotation to a rotation axis 57. In this internal-surface 55a, the sideways heights 90 projected to the inner direction toward the spin chuck 51 is formed in the position which estranged only predetermined distance from the soffit to the upper part. This sideways heights 90 has bisected the field of internal-surface 55a of a splash guard 55 in the 1st lead area 91 by the side of a lower part, and the 2nd lead area 92 by the side of the upper part. If it puts in another way, the sideways heights 90 is formed in the boundary section of the 1st lead area 91 and the 2nd lead area 92. The 1st lead area 91 is a field for guiding the medical fluid which should be collected to the 1st tub 71. the [moreover,] -- 2 lead area 92 is a field for guiding the processing liquid which should be discarded to the 2nd tub 72

[0032] **** 90a which hung caudad is formed in the point (site which approached the spin chuck 51 most) of the sideways heights 90. Thereby, the downward concavity 93 which became depressed up and was wide opened caudad as a result is formed in the 1st lead area 91. Let top panel 93a of this downward concavity 93 be the inclined plane formed so that a path might become small so that it goes up. In the lower part side of this top panel 93a, perpendicular cylinder side 93b stands in a row.

[0033] On the other hand, top panel 95a which consists of an inclined plane formed so that a path might become small is formed in it so that it goes to the site by the side of the upper part of the 2nd lead area 92 up, and in the lower part side of this top panel 95a, perpendicular cylinder side 95b stands in a row. Therefore, the sideways concavity 95 which became depressed toward the orientation which deserts a spin chuck 51 by the top of top panel 95a, cylinder side 95b, and the sideways heights 90, and was wide opened in the orientation of a spin chuck 51 is formed.

[0034] It is prolonged further up and the upward heights 96 which has a perpendicular cylinder internal surface is formed so that it may stand in a row from the upper-limit side of top panel 95a of the sideways concavity 95. In this substrate processor, while the vertical orientation position of a spin chuck 51 is held uniformly, the splash guard 55 and the processing cup 54 fluctuate if needed. The 1st height (H1) to which the processing liquid which jumps out of wafer W which a splash guard 55 is held by the spin chuck 51, and is in the rotation status around specifically hits the 1st lead area 91, The 2nd height (H2) to which the processing liquid which jumps out of wafer W which is similarly held at a spin chuck 51 and is in the rotation status around hits the 2nd lead area 92, Upper-limit 55b of a splash guard 55 is alternatively controlled by three heights with the 3rd height (H3) located below the wafer hold height (HW) in a spin chuck 51. Moreover, the processing cup 54 is alternatively controlled by the processing height (HP) to which upper-limit 54a is located in the wafer hold height (HW) in a spin chuck 51, and the almost same height, and the evacuation height (HR) which can avoid an interference with this splash guard 55 when a splash guard 55 is located in the 3rd above-mentioned height (H3).

[0035] Side-attachment-wall 54b of the processing cup 54 has entered between the side attachment wall of a splash guard 55, and the support member 78. In the upper part of upper-limit 54a of this processing cup 54, it attaches, flange 55c is located and installation of the support member 78 is attained by the bolt 79 which was formed in the orientation of outside by ******ing from near [upward heights 96] the splash guard 55 and which is screwed in this installation flange 55c.

[0036] Drawing 2 is a cross section for explaining the configuration for fluctuating the splash guard 55 and the processing cup 54. The soffit of the support member 78 of the shape of a cylinder which supports a splash guard 55 is being fixed to the tabular splash-guard base 100 arranged horizontally. The top flanges 101a and 102a of the bellow cross parallel (bellows) 101,102 of the couple arranged in parallel along the perpendicular orientation are being fixed to the inferior surface of tongue of this splash-guard base 100. The bottom flanges 101b and 102b of the bellow cross parallel 101,102 of these couples are being fixed to the spin base 123 attached at a level with the base 120 of a substrate processor. And the splash-guard shaft (guide shaft) 103,104 has inserted in the interior of a bellow cross parallel 101,102, respectively, and these are inserted in it free [a slide of the ball bushing 105,106 fixed to the spin base 123]. The upper limit of the splash-guard shaft 103,104 is being fixed to the top flanges 101a and 102a of a bellow cross parallel 101,102, and those soffits are being fixed to the bottom movable plate 125 with the bolt 107,108.

[0037] The ball nut 136 is being fixed to the site between the shafts 103,104 of a couple in the bottom movable plate 125. The screw-thread shaft 137 which meets in the perpendicular orientation is screwing in this ball nut 136. A upper limit and near a soffit this screw-thread shaft 137 are supported by the bearing 138,139, respectively, and the pulley 142 which the driving force from a motor 140 is delivered through a belt 141 is being further fixed to the soffit. Therefore, by rotating a motor 140, the bottom movable plate 125 can be moved up and down and a splash guard 55 can be moved up and down. In this way, the vertical drive 81 is constituted by the support member 78, the splash-guard shaft 103, the screw-thread shaft 137, the ball nut 136, the motor 140, etc.

[0038] In order to control the height of a splash guard 55 alternatively in the 1st of the above, the 2nd, and 3rd heights (H1, H2, H3), a spacing is opened in the vertical orientation and the phot micro sensor sensor 151,152,153 for detecting the position of the vertical movable plate 125 is arranged at the movable domain of the bottom movable plate 125. On the other hand, the processing cup 54 is being fixed to the cup base 160. The top flanges 161a and 162a of the bellow cross parallel (bellows) 161,162 of the couple arranged along the perpendicular orientation are being fixed to the inferior surface of tongue of this cup base 160. The bottom flanges 161b and 162b of these bellow cross parallels 161,162 are being fixed to the top of the spin base 123. In the inferior surface of tongue of the spin base 123, the ball bushing 163,164 is being fixed to the position corresponding to a bellow cross parallel 161,162, respectively, and the processing cup shaft (guide shaft) 165,166 of a couple is arranged along the perpendicular orientation so that this ball bushing 163,164, the spin base 123, and the bellow cross parallel 161,162 may be inserted in. Each upper limit of the processing cup shaft 165,166 of this couple is being fixed to the top flanges 161a and 162a of a flange 161,162, respectively, and each soffit of these processing cup shafts 165,166 is being fixed to the bottom movable plate 167.

[0039] In the internal space of a bellow cross parallel 161,162, the processing cup shaft 165,166 is looped around and equipped with the compression coiled spring 158,159 between the top flanges 161a and 162a and the bottom flanges 161b and 162b. The boss 126,127 of a couple protrudes on the inferior surface of tongue of the spin base 123, and the shaft 128,129 is being fixed to it underneath the boss 126,127 of this couple, respectively. These shafts 128,129 are inserted in free [a slide of the bottom movable plate 167], and the nut 130,131 is screwing them in the site by the side of the upper part rather than this bottom movable plate 167. On the other hand, in the shaft 128,129, the site by the side of a lower part is looped around the compression coiled spring 132,133 rather than the bottom movable plate 125, and the nut 134,135 for preventing defluxion of the compression coiled spring 132,133 etc. is attached in the soffit of each shaft 128,129.

[0040] Thus, the bottom movable plate 167 is energized in the from cartridge towards the upper part by the compression coiled spring 158,159,132,133, and the variation rate to the upper part is regulated with the nut 130,131. The contact pin (lead member side contact section) 168,169 of a couple turns to the bottom movable plate 125 caudad, and protrudes on it. The head (lower part side edge section) of these contact pins 168,169 will contact the contact sections (tub side contact section) 167A and 167B of the bottom movable plate 167 in process of the variation rate, if the bottom movable plate 125 is turned caudad and carries out a variation rate by driving a motor 140. Therefore, by driving a motor 140 further and dropping the bottom movable plate 125 after that, the spring force of the compression coiled spring 158,159,132,133 can be resisted, and the variation rate of the bottom movable plate 167 can be carried out caudad. That is, after [both] the contact pin 168 contacts the bottom movable plate 167, the splash guard 55 and the processing cup 54 can be dropped.

[0041] In order to control the height of the processing cup 54 alternatively in an above-mentioned processing height (HP) and an above-mentioned evacuation height (HR), a spacing is opened in the vertical orientation and the phot micro sensor 155,156 for detecting the position of this bottom movable plate 167 is arranged at the movable domain of the bottom movable plate 167. Drawing 3 is a cross section showing the configuration for attaining smooth vertical movement of the processing cup 54 and the splash guard 55. Although the configuration relevant to a bellow cross parallel 101 is shown in this drawing 3 , the same configuration is adopted also about the bellow cross parallel 102,161,162.

[0042] The splash-guard shaft 103 inserted in the interior of a bellow cross parallel 101 is the thing of the hollow structure where the airstream path 190 was formed in the interior. And in the splash-guard shaft 103, the free passage way 191 for making the airstream path 190 and the internal space 195 of a bellow cross parallel 101 open for free passage is formed in the site near the top flange 101a of a bellow cross parallel 101. Moreover, the free passage way 192 for making the airstream path 190 and outer space open for free passage is formed near [out of which it has prolonged and come to the exterior of a bellow cross parallel 101] the soffit of the splash-guard shaft 103.

[0043] Thereby, when a bellow cross parallel 101 develops, the air of the exterior of a bellow cross parallel 101 passes along the free passage way 192, the airstream path 190, and the free passage way 191, and is led to the internal space 195 of a bellow cross parallel 101. Moreover, when a bellow cross parallel 101 contracts, the air in the internal space 195 of a bellow cross parallel 101 is led to outer space through the free passage way 191, the airstream path 190, and the free passage way 192. Thus, in case a bellow cross parallel 101 expands and contracts by having established the free passage path which makes a bellow cross parallel 101 and outer space open for free passage, reduced pressure or compression of a bellow cross parallel 101 of internal air do not arise.

[0044] Thus, since expansion and contraction of a bellow cross parallel 101,102,161,162 are made smoothly, smooth vertical movement of the splash guard 55 and the processing cup 54 is attained. Drawing 4 , the drawing 5 , and the drawing 6 are illustration views showing the physical relationship of the splash guard 55, the processing cup 54, etc. in each phase of a down stream processing. Drawing 4 shows the physical relationship at the time of medical fluid washing, drawing 5 shows the physical relationship at the time of a pure-water rinse, and drawing 6 shows the physical relationship at the time of wafer carrying in / taking out.

[0045] First, the schema of processing is explained. First, it is carried in by the carrier robot which one wafer W does not illustrate, and this wafer W is held at a level with a spin chuck 51. Then, a spin chuck 51 rotates and high-speed rotation is carried out at the circumference of the vertical axis by which wafer W passes along the center by this. Towards this top and/or inferior surface of tongue of wafer W by which high-speed rotation is carried out, a medical fluid is breathed out from processing liquid regurgitation nozzle 1A or medial-axis nozzle 1C, and medical fluid washing processing using the etching reagent etc. is performed. Then, for washing of the vertical side of wafer W, a pure water is breathed out from nozzles 1B and 1C, and a medical fluid is flushed (pure-water rinse processing). And after stopping the regurgitation of a pure water and shaking off the moisture of the vertical side of wafer W, rotation of a spin chuck 51 is stopped and wafer W is taken out by the carrier robot out of equipment.

[0046] As shown in drawing 4 at the time of medical fluid washing processing, the processing cup 54 is in the processing height HP, and a splash guard 55 is in the 1st height H1. At this time, the bottom movable plate 167 is in contact with the nut 130,131, and is in the status that the variation rate to the upper part was regulated. Moreover, the contact pin 168,169 is estranged from the bottom movable plate 167. And the bottom movable plate 125 is detected by the phot micro sensor 151, and the bottom movable plate 167 is detected by the phot micro sensor 155.

[0047] In this status, the 1st lead area 91 is led to the height of wafer W as mentioned above. The medical fluid supplied to wafer W from nozzles 1A and 1C is transmitted to the top and/or inferior surface of tongue of wafer W, and jumps out to the periphery with a centrifugal force. This medical fluid is led to the 1st tub 71 in the 1st lead area 91. At this time, the sideways heights 90 prevents that a medical fluid flows into the 2nd lead area 92. There is especially no possibility that the medical fluid which hit the 1st lead area 91 may flow into the 2nd lead area 92 since **** 90a is formed at the nose of cam of the sideways heights 90 and the downward concavity 93 is formed in the upper part of the 1st lead area 91 in this operation gestalt.

[0048] On the other hand, as shown in drawing 5 at the time of pure-water rinse processing, the processing cup 54 is in the processing height HP like the time of medical fluid washing processing, and the splash guard 55 is led to the 2nd height H2 lower than the 1st height H1. In this status, the processing liquid (pure water in this case) which is transmitted to the top and/or inferior surface of tongue of wafer W which were held at the spin chuck 51, and disperses around is led to the 2nd tub 72 by this 2nd lead area 92 in the 2nd lead area 92. Moreover, the bottom movable plate 125 is detected by the phot micro sensor 152, and the bottom movable plate 167 is detected by the phot micro sensor 155.

[0049] In the state of drawing 5 , the bottom movable plate 125 and the bottom movable plate 167 are close, and the contact pin 168,169 is in contact with the top of the bottom movable plate 167. Moreover, the nose of cam of the batch member 73 into which the 1st tub 71 and 2nd tub 72 are divided is not contained in the downward concavity 93 formed in the 1st lead area 91. For the reason, the processing

liquid (pure water after using for washing processing) which hit the 2nd lead area 92 is not led to the 1st tub 71. At this time, it prevents that the processing liquid which hit the 2nd lead area 92 jumps out of the sideways concavity 90 formed in the 2nd lead area 91 to the equipment exterior. Moreover, **** 90a formed downward at the nose of cam of the sideways heights 90 leads smoothly the processing liquid from the 2nd lead area 92 to the 2nd tub 72 of the lower part. Furthermore, the splash of the processing liquid with which the upward heights 96 formed in the upper part of the 2nd lead area 92 disperses from wafer W prevents jumping out to the equipment exterior. About this point, when a splash guard 55 is in the 1st height H1, it is the same.

[0050] In case wafer W is carried in to this substrate processor, and in case wafer W is taken out from this substrate processor, as shown in drawing 6 , a splash guard 55 is led to the 3rd height H3 still low than the 2nd height H2. Since the contact pin 168,169 is in contact with the bottom movable plate 167 when a splash guard 55 is in the 2nd height H2, when a splash guard 55 is led to the 3rd height H3 from the 2nd height H2, the bottom movable plate 167 also downs simultaneously and the processing cup 54 is led to evacuation height HR.

[0051] When raising a splash guard 55 from the 3rd height H3, the processing cup 54 also goes up simultaneously by work of the compression coiled spring 158,159,132,133. In this way, two members of a splash guard 55 and the processing cup 54 can be operated in a different mode with one vertical drive 81, respectively. And when the processing cup 54 moves up and down and a splash guard 55 is dropped, an interference with this splash guard 55 and the processing cup 54 can be avoided. Therefore, the height of the processing cup 54 can be made low and there is an advantage that equipment can be miniaturized. Thereby, the effect that the configuration of a splash guard 55 can be simplified is also acquired.

[0052] In addition, in the state of drawing 6 , the bottom movable plate 125 is detected by the phot micro sensor 153, and the bottom movable plate 167 is detected by the phot micro sensor 156. When the splash guard 55 is located in the 3rd height H3, the upper limit of this splash guard 55 is in a position lower than the wafer hold height HW by the spin chuck 51. Delivery of wafer W is performed between the carrier robots and the spin chucks 51 which are not illustrated in this status. Since there is a processing liquid attachment site (namely, internal surface) of a splash guard 55 caudad rather than wafer W in that case, in case wafer W is delivered, there is no possibility that the processing liquid from a splash guard 55 may fall to wafer W.

[0053] Drawing 7 is a block diagram showing the electric configuration of the important section of the above-mentioned substrate processor, and the configuration for controlling the rotation drive 70 for carrying out the rotation drive of the spin chuck 51, the processing liquid feed zone 80, and the vertical drive 81 for fluctuating the splash guard 55 and the processing cup 54 is shown. An operation of the rotation drive 70, an operation of the processing liquid feed zone 80, and an operation of the vertical drive 81 are controlled by the control section 200 containing CPU, ROM, and RAM according to the program stored in concerned ROM or concerned RAM.

[0054] The output signal from the phot micro sensors 151 and 152,153,155,156 is given to the control section 200, and a control section 200 carries out normal rotation/inversion drive of the motor 140 (refer to the drawing 2) of the vertical drive 81 based on the output of these sensors. Thereby, a control section 200 controls a splash guard 55 in the 1st height H1, the 2nd height H2, and the 3rd height H3. By this, a control section 200 will control the height of the processing cup 54 as a result at the processing height HP or evacuation height HR.

[0055] Namely, the function as a 1st control means by which a control section 200 controls a splash guard 55 in the 1st height H1 in case the medical fluid as 1st processing liquid is supplied to wafer W, The function as a 2nd control means to control the height of a splash guard 55 in the 2nd height H2 in case the pure water as 2nd processing liquid is supplied to wafer W, It has the function as a 3rd control means to control the height of a splash guard 55 in the 3rd height H3 in the case of carrying in/taking out of wafer W.

[0056] Furthermore, the control section 200 also has the function as a washing control means to control an operation of each part, in order to perform automatic washing of a splash guard 55. That is, when, washing out the medical fluid adhering to the 1st lead area 91 for example, a control section 200 controls the motor 140 of the vertical drive 81, and leads a splash guard 55 to the 1st height H1. Moreover, a control section 200 controls the motor 62 of the rotation drive 70, and carries out the rotation drive of the spin chuck 51. A control section 200 controls the processing liquid feed zone 80 by this status, and makes a pure water breathe out as a penetrant remover from nozzle 1B further in it. This pure water will be transmitted to the anchoring disk 60, will be led in the orientation which deserts a rotation axis 57, and will be led to the 1st lead area 91 from the anchoring disk 60. The medical fluid which adhered to the 1st lead area 91 for guiding a medical fluid by this can be flushed. The pure water for washing may be supplied from nozzle 1D, and can perform simultaneously washing of the inferior surface of tongue of the anchoring disk 60, and washing of a splash guard 55 in this case.

[0057] In addition, in order to wash the 1st lead area 91 good, it is desirable that a splash guard 55 is controlled in a height lower a little than the 1st height H1, and the water from the anchoring disk 60 is made to spread that there are no dark circles in the internal surface of the 1st lead area 91. Moreover, while the dummy substrate which has a configuration equivalent to wafer W is made to hold to a spin chuck 51 and this dummy substrate is rotated in the case of washing processing, you may be made to supply a pure water from nozzle 1B towards the center of a top of this dummy substrate. In this case, the 1st lead area 91 can be washed good by controlling a splash guard 55 in the 1st height H1. Moreover, in this case, a pure water is turned in the center of a inferior surface of tongue of wafer W, and is supplied from medial-axis nozzle 1C, and the water which is transmitted to the inferior surface of tongue of wafer W, and disperses on the outskirts can wash the 1st lead area 91.

[0058] Similarly, washing of the 2nd lead area 92 can be performed by controlling the height of a splash guard 55 in the 2nd height H2 (or height higher a little than a height H2). However, in this operation gestalt, since the 2nd lead area 92 is an area for lead of a pure water, washing of the 2nd lead area 92 is not so important as washing of the 1st lead area 91.

[0059] As mentioned above, according to the substrate processor of this operation gestalt, the internal surface of a splash guard 55 is attained to 1st lead area 91, the 2nd lead area 92 is formed, and the sideways heights 90 is further formed in these boundary sections. And when the splash guard 55 of such a configuration fluctuates, the pure water which the medical fluid which disperses around from wafer W is made to hit the 1st lead area 91, and is led to the 1st tank 71, and disperses around from wafer W is made to hit the 2nd lead area 92, and is led to the 2nd tub 72.

[0060] In this way, a medical fluid and a pure water are separable by going up and down a splash guard 55. In this case, since it does not pass along the path in which a medical fluid and a pure water are common, the various problems resulting from the mixture with the medical fluid and pure water which were pointed out by the term of a "proior art" are conquered. Furthermore, since supply of processing liquid on the inferior surface of tongue of wafer W is performed from medial-axis nozzle 1C, processing liquid will be

supplied from the position close to the inferior surface of tongue of wafer W towards the center of a inferior surface of tongue of wafer W. therefore -- without most processing liquid supplied to the inferior surface of tongue of wafer W falls -- the inferior surface of tongue of wafer W -- being transmitted -- the [the 1st lead area 91 or] -- it will be led to 2 lead area 92 Thereby, recovery of a medical fluid and a pure water after using it for processing can be discarded good.

[0061] And since a gear drive like the conventional technique is not used for the separation of processing liquid, the problem of raising dust is not produced, either. Moreover, since the ball bushing 105,106,163,164 is adopted as the sliding section for permitting vertical movement of the splash guard 55 and the processing cup 54, there is little raising dust as compared with the case where a skid bearing is used. And though raising dust arises by sliding of this fraction, a diffusion of this raising dust is prevented by the bellow cross parallel 101,102,161,162. Thereby, vertical movement of the splash guard 55 and the processing cup 54 can be attained, without producing most raising dust. And although there is a possibility of vibration occurring, and the drop adhering to the splash guard dispersing, and adhering to the front face of wafer W in case it is vertical movement since it is easy to generate poor sliding if a skid bearing is used, such a problem does not arise in the configuration of this operation gestalt using the ball bushing. Moreover, since the medical fluid ambient atmosphere and the shaft 103,104,165,166 are isolated by using the bellow cross parallel 101,102,161,162, it is effective in the ability to prevent the cauterization of a shaft 103,104,165,166.

[0062] Furthermore, in this operation gestalt, the 2nd tub 72 for receiving the processing liquid which should be discarded is located inside to the rotation axis of wafer W rather than the 1st tub 71 for receiving the processing liquid which should be collected. It can prevent mixing in the processing liquid which the processing liquid which should be discarded should collect by this. At the time of medical fluid processing, if it explains still in detail, although a medical fluid is led to the 1st tub 71 from the 1st lead area 91, not all the medical fluids that disperse around from wafer W can necessarily arrive at the 1st lead area 91, and there is also a possibility that a part of medical fluid may scatter from the 1st lead area 91 even to the 2nd tub 72 inside the batch member 73, again. On the other hand, at the time of pure-water rinse processing, there is no possibility that processing liquid may surely be led inside a diaphragm 73, and the pure water after washing processing may be led to the 1st tub 71.

[0063] Medical fluids are collected, and when it is going to discard a pure water after being used for washing processing by the 2nd tub 72 by the 1st tub 71, an amount has a little a possibility of entering into the 2nd tub 71, among this pure water. When it does so, a pure water will mix in the medical fluid which should be collected, and there is a possibility that the concentration of a medical fluid may fall a little. On the other hand, if the 1st tub 71 arranged outside recovers a medical fluid like this operation gestalt, the above-mentioned problem will not be produced. Though the medical fluid of an amount scatters a little to the 2nd tub 72 for receiving the pure water which should be discarded, there is no big problem.

[0064] Moreover, the splash guard 55 used in this operation gestalt consists of a smooth surface in which a discontinuous point does not have the everywhere of internal-surface 55a so that clearly from drawing 1 . That is, a corner does not exist in internal-surface 55a. Therefore, there is no possibility that processing liquid may pile up in internal-surface 55a, and, naturally there is no possibility that the bad influence by scattering to the wafer front face of processing liquid in which it piled up may arise. in addition, internal-surface 55a -- a completely smooth front face -- not but -- ** -- unless it can attain the same effect and stay of processing liquid arises, internal-surface 55a may be constituted by the plane combination connected at an angle big enough

[0065] Furthermore, with this operation gestalt, since the splash guard 55 and the processing cup 54 serve as another parts, a splash guard is removed easily and there is also an advantage that the washing and exchange can be performed. Although an explanation of this operation gestalt is as above, this invention is not limited to this operation gestalt. For example, although the example from which two kinds of processing liquid is separated was taken, three or more lead areas are established in a splash guard 55, and you may enable it to separate three or more kinds of processing liquid in the gestalt of the above-mentioned operation. However, it is necessary to prepare the tub of the number corresponding to the number of a lead area in the processing cup 54 in this case.

[0066] The example of a configuration for separating three kinds of processing liquid is shown in drawing 8 . That is, in this example, two sideways heightss 211 and 212 open a spacing in splash-guard 55A, and are formed in the vertical orientation at it, it turns at the nose of cam of each sideways heightss 211 and 212 caudad, and **** 211a and 212a is formed in it, respectively. Thereby, the 1st processing liquid is led to the 1st tub 231 of the lower part from the 1st lead area 221 of the lower part of the sideways heights 211. Moreover, from the 2nd lead area 222 between the sideways heights 211 and the sideways heights 212, the 2nd processing liquid is guided at **** 211a, and is led to the 2nd tub 232 of the lower part. Similarly, from the upper 3rd lead area 223 of the sideways heights 212, the 3rd processing liquid is guided at **** 212a, and is led to the 3rd tub 233 of the lower part. The point that splash-guard 55A moves up and down in order to apply alternatively the 1st processing liquid from wafer W, the 2nd processing liquid, and the 3rd processing liquid to the 1st, the 2nd, and 3rd lead areas 221,222,223, respectively is the same as that of the case of the above-mentioned operation gestalt.

[0067] Moreover, although the 1st tub 71 corresponding to the 1st lead area 91 explained the example arranged outside the 2nd tub corresponding to the 2nd lead area 92 with the above-mentioned operation gestalt, as shown in drawing 9 , it is also possible to arrange the 1st tub 241 corresponding to the 1st lead area 251 inside the 2nd tub 242 corresponding to the 2nd lead area 252. If it explains more concretely, the sideways heights 253 projected toward the inner direction among the boundary section of the 1st lead area 251 and the 2nd lead area 252 is formed in splash-guard 55B shown in drawing 9 . The processing liquid path 255 for guiding caudad the processing liquid which hit the 1st lead area 252 is formed in the base of this sideways heights 253. Moreover, the interior material 254 of a proposal projected caudad is formed near the nose of cam of the sideways heights 253, and the front face of this interior material 254 of a proposal constitutes the 1st lead area 251.

[0068] The processing liquid which dispersed from wafer W and hit the 1st lead area 251 falls caudad along with the interior material 254 of a proposal, and is led to the 1st tub 241 arranged inside. Moreover, the processing liquid which dispersed from wafer W and hit the 2nd lead area 252 falls caudad through the processing liquid path 255, and is received in the 2nd tub 242 arranged outside.

[0069] Furthermore, in the above-mentioned operation gestalt, although it is made to apply the processing liquid from a wafer to a predetermined lead area by moving a splash guard 55 up and down, processing liquid may be made to hit the predetermined lead area of a splash guard 55 by moving a spin chuck 51 up and down. However, the seal of the drive relevant to a spin chuck 51 in the direction of the configuration of the above-mentioned operation gestalt which does not move a spin chuck 51 up and down is easy.

[0070] Moreover, although the equipment which performs processing to a wafer was taken for the example with the above-mentioned operation gestalt, this invention is applicable also like the equipment for performing processing to other substrates like the glass substrate for LCDs. In addition, it is possible to give various change in the domain indicated by the claim.

[Translation done.]